

**COLORADO RIVER RECOVERY PROGRAM
FY-2004–2007 PROPOSED SCOPE OF WORK for:**
(Entrainment of larval razorback sucker)

Project No: C-6 rz entrainment

Lead Agency: Utah Division of Wildlife
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Category:

- ☐ Ongoing project
- ☒ Ongoing-revised project
- ☐ Requested new project
- ☐ Unsolicited proposal

Expected Funding Source:

- ☒ Annual funds
- ☐ Capital funds
- ☐ Other (explain)

I. Title of Proposal:

Evaluation of larval razorback sucker drift and entrainment into depression floodplain wetlands of the middle Green River.

II. Relationship to RIPRAP:

GENERAL RECOVERY PROGRAM SUPPORT ACTION PLAN

- II. Restore Habitat (Habitat Development and Maintenance)
- II.A. Restore flooded bottomland habitats.

GREEN RIVER ACTION PLAN: MAINSTEM

- II. Restore Habitat (Habitat Development and Maintenance)
- II.A. Restore and manage flooded bottomland habitat.
- II.A.3. Implement levee removal strategy at high priority sites.
- II.A.3.d. Evaluation.

III. Study Background/Rationale and Hypothesis:

Floodplain wetlands are presumed to be important rearing habitat for the endangered razorback sucker (Wydoski and Wick 1998; Muth et al. 1998; Lentsch et al. 1996). Reproduction by razorback suckers occurs in the spring during peak flows of the

hydrograph when highly productive floodplain habitats are accessible (Muth et al. 1998). This seasonal timing of razorback sucker reproduction indicates possible adaptation for utilizing floodplain habitats (Muth et al. 1998).

Based on the assumption that floodplain wetlands provide critical rearing habitat for razorback suckers, the Recovery Program initiated an extensive floodplain habitat restoration program (Levee Removal). The goal of the Levee Removal Program was to restore natural floodplain wetland habitats and functions that support recovery of endangered fish (specifically the razorback sucker) (Lentsch et al. 1996). To accomplish this goal, levees at selected wetlands were lowered to increase the frequency of the riverine-floodplain connection to pre-Flaming Gorge Dam levels.

Valdez (2003) developed a larval razorback sucker drift model to be used as a predictive tool for the number of floodplain acres and number of razorback larvae necessary to reach the recovery goals. An important element of this model demonstrated how quickly razorback larvae “fall” out of the river as part of the planktonic drift. If this prediction is correct most of the larvae produced at Razorback Bar would not reach the major floodplain sites at Ouray. This has major management implications for the relative importance of different floodplain sites along the river and the importance of other potential spawning sites. Optimization of larval entrainment in the floodplain will be crucial for ensuring survival of larval razorback suckers, and ultimately recovery. If the model is correct, sites like Thunder Ranch and Stewart Lake become the most important sites on the middle Green River.

II. Study Goals, Objectives, End Product:

Study Goal

Evaluate larval razorback sucker entrainment into the Thunder Ranch and Stewart Lake depression floodplain wetlands and use the data to revise management for middle Green River floodplains based on potential larval razorback sucker entrainment.

Study Objectives

1. Evaluate drifting and entrainment rates into Thunder Ranch and Stewart Lake floodplain sites from Razorback/Escalante spawning bar.
2. Evaluate larval drift and entrainment into floodplains from other potential spawning sites.
3. Continue to evaluate the effectiveness of breach connections for entraining drift at various points on the hydrograph.
4. Use data for testing floodplain management scenarios.

End Product

Report rates of entraining planktonic drift that was released into the river at Razorback/Escalante Bar and approximately one mile upstream of floodplain breeches at Thunder Ranch and Stewart Lake. This report will present the entrainment data for Thunder Ranch and Stewart Lake, as well as additional data for the best breech configuration for larval razorback sucker entrainment into floodplains. Draft report to coordinator March 1, 2007; to peer reviewers and Biology Committee April 1, 2007; final draft to Biology Committee June 15, 2007.

III. Study Area:

Razorback Bar (RM 311) to Thunder Ranch (RM 305) and Stewart Lake (RM 299) on the Middle Green River, Utah.

IV. Study Methods/Approach

Note: This project will only be conducted if sufficient flows and numbers of larval razorback sucker are available.

Question 1: How accurately do passively drifting particles (beads) represent downstream drift of hatchery reared razorback sucker larvae?

Biodegradable gelatinous neutrally buoyant beads (beads) and marked hatchery-reared razorback sucker larvae will be released simultaneously into the river at known numbers at the current spawning sites and approximately one mile upriver of the floodplain breaches at Thunder Ranch and Stewart Lake to evaluate entrainment. Dudley and Platania (2000) reported extremely similar travel rates of passively drifting particles (neutrally buoyant beads) and larval Colorado pikeminnow in the San Juan River in 1999. We will test how accurately beads act as surrogates to drifting razorback sucker larvae.

Question 2: How is drift and entrainment affected by different flow conditions?

Beads will be released on the ascending and descending limb of the hydrograph. Three years are proposed for the study to test the drift and entrainment under different flow conditions

Question 3: How does entrainment change as distance from spawning site increases?

Beads of different colors will be used to differentiate release locations (i.e., Razorback Sucker Spawning Bar, 1 mile upstream of Thunder Ranch, and 1 mile upstream of Stewart Lake). The numbers of beads collected at each floodplain site will enable an evaluation of the importance of Thunder Ranch and Stewart Lake relative to the current

spawning site (Razorback/Escalante bar). The floodplain connections will be sampled with drift nets to capture the beads as they drift into the sites.

Question 4: Which floodplain and breach configurations are better at entraining drifting beads and larvae?

In addition to the colored beads, drifting stocked larvae will also be collected and used in the analysis to test the value of the beads as a surrogate for drifting larvae. During 24-hour monitoring, flow will be calculated at the beginning of each 8-hour crew change. An estimate for the total number of larvae entrained each day will be calculated by extrapolating the number of larvae caught per volume of water sampled to the total volume of water flowing into the site. The total contents of each drift net set will be preserved in alcohol.

Data collected will be used to develop floodplain management scenarios.

V. Task Description and Schedule

Task 1: Field Data Collection

Bead release and drift netting - river-floodplain connection 2004-2006

Task 2: Drift Net Sample Processing

Drift net initial picking (UDWR) - Summer 2004-2006

Task 3: Data Management

Data entry Fall-Winter 2004-2006

Task 4: Report Preparation

Annual RIP Report (November 2004-2006)

Final Report

Draft report to coordinator March 1, 2007; to peer reviewers and Biology

Committee April 1, 2007; final draft to Biology Committee June 15, 2007.

VI. FY-2004 Work

-Deliverables/Due Dates

Annual RIP report 14 November 2004

-Budget

Task 1: Bead release and drift netting

Labor-	Work days	Cost
Project Leader (405/day)	10	4,050
Biologist (315/day)	20	6,300
Technician (180/day)	50	9,000
Travel (\$35/day/vehicle)	40	1,400
Materials (Beads)		4,000
Equipment (maint.)		400
Other		500
Task 1 Subtotal		25,650

Task 2: Drift Net Sample Processing

Labor-	Work days	Cost
Project Leader (405/day)	2	810
Biologist (315/day)	10	3,150
Technician (180/day)	40	7,200
Travel (\$35/day/vehicle)	1	35
Materials		200
Task 2 Subtotal		11,395

Task 3: Data management/data entry

Labor-	Work days	Cost
Project Leader (405/day)	2	810
Biologist (315/day)	5	1,575
Technician (180/day)	10	1,800
Travel (\$35/day/vehicle)	3	105
Materials		200

Task 3 Subtotal		4,490
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Task 4: Report preparation

Labor-	Work days	Cost
Project Leader (405/day)	2	810
Biologist (315/day)	4	1,260
Technician (180/day)		0
Travel (\$35/day/vehicle)	3	105
Materials		200

Task 4 Subtotal		2,375
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Total for FY2004	\$43,910	
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FY-2005 Work

-Deliverables/Due Dates

Annual RIP report 11/05

-Budget

Task 1: Bead release and drift netting

Labor-	Work days	Cost
Project Leader (425/day)	10	4,250
Biologist (330/day)	20	6,600
Technician (189/day)	50	9,450
Travel (\$35/day/vehicle)	40	1,400
Materials (Beads)		4,000
Equipment (maint.)		400
Other		500
Task 1 Subtotal		26,600

Task 2: Drift Net Sample Processing

Labor-	Work days	Cost
Project Leader (425/day)	2	850
Biologist (330/day)	10	3,300
Technician (189/day)	40	7,560
Travel (\$35/day/vehicle)		0
Materials		200
Task 2 Subtotal		11,910

Task 3: Data management/data entry

Labor-	Work days	Cost
Project Leader (425/day)	2	850
Biologist (330/day)	5	1,650
Technician (189/day)	10	1,890
Travel (\$35/day/vehicle)	3	105
Materials		200

Task 3 Subtotal		4,695
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Task 4: Report preparation

Labor-	Work days	Cost
Project Leader (425/day)	2	850
Biologist (330/day)	4	1,320
Technician (189/day)		0
Travel (\$35/day/vehicle)	3	105
Materials		200

Task 4 Subtotal		2,475
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FY2005 TOTAL		\$45,680
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FY 2006 budget will be the same as FY 2005 with a 5% inflation adjustment.

FY 2007 - Final Report Preparation \$15,000

VII. Budget Summary

	<u>Cost</u>
FY-2004	\$43,910
FY-2005	\$45,680
FY-2006	\$47,964
FY-2007	\$15,000
Project Total	\$152,554

VIII. Reviewers: Biology Committee

IX. References

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